UNITED STATES DEPARTMENT OF AGRICULTURE
OFFICE OF PUBLIC ROADS AND RURAL ENGINEERING
WASHINGTON, D. C.

FIELD LETTER FOR MAY No. 16.
June 1, 1916.

DIVISION OF CONSTRUCTION
Vernon M. Peirce, Chief.

Projects:

Advice and Inspection

The plans and specifications for a system of roads in Marion County, Tenn., were completed May 14, and M. E. Worrell, H.E., who had been assisting the County Engineer on that work was assigned to assist the County Engineer of Monroe County, Tenn., on similar work until construction work is begun in Marion County.

J. T. Voshell, S.H.E., in the early part of May, visited Fayette and Kenton Counties, Kentucky, to confer with the county officials relative to different types of road surfacing materials. He also visited Mr. Brainard at Bloomington, Indiana, and inspected the Ohio Post Road.

H. C. Wells, S.R.C., is now at Terra Alta, West Virginia, representing the State Road Bureau, and assisting the County Engineer in preparing plans and specifications for a system of roads to be improved from the proceeds of a recent bond issue.

Geo. D. Marshall, S.R.C., collected statistical data for the Division of Economics until May 17, on which date he proceeded to Austin, Texas, to cooperate with the Governor and the various good roads associations of Texas on general road work throughout the State.

From May 1 to May 20, F. A. Davis, J.H.E., inspected the Diamond Loop Highway through Brooks County, Texas, and prepared a report relative to its improvement. Mr. Davis was then given an assignment in Le Flore and Pushmataha Counties, Okla., to assist the County Engineers in locating a state highway across the mountains of western Oklahoma.

W. A. Crossland, S.H.E., on May 13, completed his report relative to the construction of a road from Birmingham, Alabama, to the head of navigable waters of the Warrior River, and was given an assignment at Greenville, South Carolina, to advise with the local officials relative to the proper expenditure of a recent bond issue of $900,000 for road improvement. This latter assignment was completed May 23, and Mr. Crossland was assigned to cooperate with the officials of the various counties through which the Jackson Highway passes, relative to its improvement.

Object-Lesson Roads

E. S. Alderman, J.H.E., in addition to assisting the County Engineer of Palm Beach County, Florida, on contract work, is constructing two experimental roads, one near Jupiter and the other near Delray, in Palm Beach County.

R. H. Harrison, J.H.E., May 15, finished the plans and specifications for a cross-country road in Dickens County, Texas, and is now constructing a gravel object-lesson road in that county.

J. H. Dodge, S.R.C., is now at Britton, South Dakota, constructing a sand-clay object-lesson road. This work was begun May 5.

County Systems

B. H. Burrell, S.H.E., has completed reports for county systems in Escambia County and Bay County, Florida, and on May 29 was given a similar assignment in Cass County, Missouri.

E. O. Hathaway, S.H.E., completed his advice and inspection assignment at Gulfport, Mississippi, May 8 and was assigned to prepare a report for a county system for Yazoo County, Mississippi. He is still engaged on this assignment.

DIVISION OF MAINTENANCE
E. W. James, Chief.

Projects:

Inspection, Advice and Lectures

Mr. James appeared before the Board of Commissioners of Montgomery County, Maryland, on May 2 and arranged to secure $1,200 through a contract agreement toward the maintenance of the experimental roads in the county.

D. H. Winslow, S.R.C., addressed a meeting at Smithfield, N. C., on May 2 at which over 200 people were present, and spoke at Godwin, N. C., on the 3rd.

Mr. James was on itinerary in Florida from May 6 to 18, inclusive, securing cost data relative to recent road construction in that State. He visited Savannah, Georgia, and Jacksonville, St. Augustine, Gainesville, Ocala, Eustis, Tavares, Sanford, Orlando, St. Petersburg, Sarasota, and Barton, Florida, securing data of both city and county work.

On the 19th and 20th, Mr. James was in Pensacola for the purpose of conferring with B. H. Burrell, S.H.E., regarding the proposed county systems in Escambia and Bay Counties, Florida.

Washington-Atlanta Highway

The following applications have been received during the present month, extending supervision for another year.

Georgia: DeKalb County; McDuffie County; Oconee County; Oglethorpe County; Wilkes County.

North Carolina: Harnett County; Wake County.

South Carolina: Chesterfield County; Alligator and Cheraw Townships.

Virginia: Boydton and South Hill Districts.

During the week of May 8 to 13, V. E. Towles and G. C. Scales accompanied W. L. Spoon over his division of the Washington-Atlanta Highway for the purpose of meeting the officials and becoming familiar with local conditions, preparatory to a readjustment of division assignments on that road. Reassignments were made between May 15 and 20 and are as follows:

Northern section, Dinwiddie County Line, via Blackstone, Va., to Smithfield, N. C., D. H. Winslow.

Central section, Smithfield, N. C. to Columbia, S. C., V. E. Towles.

Southern section, Columbia, S. C. to Atlanta, Georgia, Geo. C. Scales.

Mr. Spoon has been transferred to the Central Highway.

From present indications, there will be more money spent in construction on the Highway in North Carolina during the coming year than has been spent any year since supervision was started. Cumberland, Harnett, Wake, and Granville Counties all expect to spend considerable sums ranging from $10,000 to $50,000 on the sections of the Highway in those counties.

The decision regarding the route to be supervised from Augusta to Atlanta, Georgia, will be made during June.

Central Highway

Applications have been received covering supervision of maintenance on the Central Highway in North Carolina, as follows:

Carteret County	$700
Craven County	1,500
Lenoir County	1,100
Wayne County	1,000
Johnston County, Boonehill Township	525
Durham County	300
Orange County	40 per mile
Alamance County	50 " "
Guilford County	800
Davidson County	1,250
Rowan County	1,300
Iredell County	Actual cost
Forsyth County	50 per mile on soil
	100 " " " macadam
Davie County	1,250

From Boonehill Township, Johnston County, to Durham, the Central Highway follows the road of the Washington-Atlanta Highway, and the entire distance with the exception of two miles in Wilsons Mill Township, Johnston County, is under application. The entire Central Highway, therefore, from Morehead City to the Catawba River, omitting only a few short sections not in condition for maintenance, has been brought under application. It is expected that Newton and Hickory Townships in Catawba County will make application and thereby carry the project to Hickory, North Carolina.

The approximate mileage in addition to the section which is common to both the Central Highway and Washington-Atlanta Highway is 338 miles. W. L. Spoon, S.H.E.,

has been assigned to the supervision of the Western Section of this road from Orange County line to the Catawba River. D. H. Winslow will be in charge of the Eastern Section, Morehead City to Orange County line.

An additional Ford automobile has been placed in service and will be used by Mr. Spoon. The original three cars used on the Washington-Atlanta Highway will remain in that service. Mr. Spoon's headquarters have been transferred to Burlington, North Carolina, Post Office Box 125.

Field Experiments

Under the direction of J. H. Eldridge, S.R.C., re-treatment of sections 17, 18, 19, and 20 of the Mt. Vernon Avenue Road was begun on May 25.

Materials have been ordered for re-treatment of sections 2, 3, and 7 of the Rockville Pike, and sections 8, 9, and 10 of South Kensington Road.

DIVISION OF NATIONAL PARK AND FOREST ROADS
T. Warren Allen, in charge.

Projects:

District 3 - O. N. Powell, in charge

It is planned to start construction on the Salt River-Pleasant Valley Road, June 15. Bids have been asked for equipment and supplies for this project and the party will leave about June 1 to stake out the road. A check for $15,000 was received from Gila County for their cooperation in this work.

Work will be resumed on the Red River Section of the Questa-Elizabethtown Road June 1. This project was left uncompleted last fall on account of bad weather conditions.

Plans and specifications for the Winslow-Long Valley Road have been completed and forwarded to Washington for approval. It is planned to begin the construction of this project about July 1.

Office work is being continued on the Pecos Valley Road (Glorieta-Panchuela) and it is planned to build about 4 miles of this road the latter part of the summer.

The survey of the Tucson-Mt. Lemmon Road was completed May 12 and the party is now in the office working up notes on this survey. This work will be rushed, as the county officials are very anxious to have the completed plans. This was an extremely difficult survey job as the road begins at an elevation of 2,700 feet and terminates at 7,700 feet and is through exceedingly difficult country, heavy rock cliffs and steep hillsides. There were an average of 44.8 transit stations to the mile on this project and 3.7 cross sections to the station. The total length of the road is 20.6 miles. This work was begun on December 10.

District 4 - C. H. Kendall, in charge.

Along the Payette River in Idaho attention has been given to the maintenance work from Gallagher to Deadwood bridge. This road is now in very good shape for the season's traffic.

Upon the Secret Pass Road in Nevada, work will be completed by the end of the month and the road open to through traffic. Final report upon this project is in preparation.

Upon the Ephraim-Orangeville Road in Utah, about 4,000 feet of heavy grading has been completed during the month in Straight canyon in Emery County; and in Sanpete County, 6 miles has been cleared and grubbed preparatory to grading and 1½ miles of new grade constructed within the Forest.

Maintenance work has been inaugurated this month upon the Logan-Garden City Road in the Cache National Forest; and upon the Damas-Stockmore Road and the Helper-Duchesne Road in the Uinta Forest.

On May 2nd, 4½ miles of the Monroe Canyon Road in the Fishlake Forest was destroyed by the failure of the Doxford reservoir dam which precipitated 350 acre-feet of water in the Monroe Canyon stream which was already at flood flow. This caused a great amount of erosion and in addition to the 4½ miles of road, 9 timber bridges were washed away in the Forest. The damage to the road and bridges will approximate $8,000.

In Arizona upon the Ryan-Big Spring Road a small crew have continued the repair and maintenance work during the month.

The two survey parties have continued on the location of the Ephraim-Orangeville Road and expect to have the final location, cross section, and estimate completed next month upon this project.

A preliminary survey is being made of the Indian Creek-National Road in the Santa Rosa Forest in Nevada and extensive cooperation is expected from the mining interests upon the construction of the west section, which will be constructed by the Hatch Mining Company in order to facilitate the operation of their mines.

District 5 - C. C. Morris, H.E., in charge.

Trinity River Road:

At the end of the month 50 men and 8 teams were working and a total of two miles of road was completed. This portion includes one crib culvert 8 by 8 feet, one culvert 2 by 6 feet, and numerous log and stone box drains. The work is in charge of a superintendent and an assistant forest ranger is detailed for clerical work, timekeeping, etc.

Stumps are being taken out by shooting and by pulling. Pulling gives much more satisfactory results as the roots are removed more completely and less material is required to backfill the hole. Much material which had been classed as rock in estimating has been moved with pick and shovel without shooting.

T. Warren Allen visited the work, May 11-13. He went over the location of the line and the working organization and suggested some changes in both.

Laguna Road:

The design of this project was completed and the tracings are now being made for forwarding to the Chief Engineer of the Forest Service.

Salmon River Road:

Deputy Supervisor Bonner, who has been handling the Trinity River Road has been detailed to make the location survey of this project and will commence field work about June 1.

Cleveland National Forest, Flood Repairs:

During the month work was begun by the Forest Supervisor on the Bautista Road and the San Jacinto Road both in Riverside County. $500 has been allotted to the Bautista project, the interested settlers donating an equal amount. $2,000 has been allotted to the San Jacinto project, Riverside County contributing about $5,000 and private interests $2,000.

District 6 - B. J. Finch, in charge.

During the month of May the office work in District 6 has been confined mainly to making up reports of work up to December 31, 1915, and in making arrangements for a proper system of reports for the calendar year 1916. It is believed that the arrangements are now made so that it will be possible to have a complete set of reports from every project on which 10 per cent funds are expended during this calendar year.

One survey party is now in the field, being engaged in staking out the Little White Salmon River Road for construction. Four miles of this road was rough-graded in 1915 and an allotment of $500 was made to this project for the coming season, to be used in cooperation with a like sum from Skamania County, Washington, for finishing up the slopes, straightening ditches, and truing up the surface of this section of the road. As soon as these ditches are staked out this survey party will proceed to complete the location survey of four miles, which will complete the survey work to be done on this project.

On the Quinault Lake Road in the Olympic National Forest a reconnaissance survey was made and the report forwarded to the Forester for approval of the project.

An allotment of $2,500 for reconnaissance surveys in the State of Washington has been approved and it is expected that considerable work will be done during the summer. In the State of Oregon an allotment of $1,000 for reconnaissance surveys has been approved and work will be begun as soon as weather conditions and snow will permit.

Construction work is still going on on the Elk Creek Road in the Umpqua National Forest, with about the same force as last month. The road is now completed from Station 3 nearly to Station 90.

A temporary allotment of $1,000 has been made to the Eagle Creek Trail in the Oregon National Forest. This allotment is for the purpose of allowing construction to begin on this project, which is to be built from Improvement Funds. As soon as the Improvement Funds become available this allotment of $1,000 will be returned to the 10 per cent fund.

Franklin County, Idaho, Work - T. C. Peterson, in charge.

During the month of May, 14 miles of center line has been located, 1½ miles was cross-sectioned, grade line established and grade stakes set. Profile was taken, grade line established, and grade stakes set on 10 miles over fairly level country.

The construction has been distributed over a distance of about 6 miles. Two graders and a steam traction engine are used on a large part of the work and scrapers are used where longitudinal distribution of dirt is required.

Skamania County Work, - James T. Schuyler, S.H.E., in charge.

The weather conditions during the past month have been unfavorable for road work. Rain, cold cloudy weather, and scarcity of labor have hampered the contractors to such an extent that it will be almost impossible for them to finish the road in time to get some traffic over it before the rainy season begins.

On account of these reasons and because of the great inconvenience to traffic during the construction of those parts where the old road will be disturbed, the County Commissioners have passed resolutions declaring the construction of the road an extraordinary emergency which will allow the contractors to work more than 8 hours a day.

Work on the Stevenson-Collins section shows little progress as there is only one station gang working and the contractor is trying out an excavator which he has recently constructed.

Work on the Mill A-Underwood section is progressing as well as can be expected considering the weather conditions.

A Model 35, Marion Steam Shovel has just been started on the heavy work and it is expected that next month's progress will be more satisfactory.

The permanent highway work consisting of 2 miles on Mill A Flat, which is about 4 miles north of Cooks, is staked and bids will be called for soon.

The contractors on the Clarke County Line-Cascades section have most of the clearing done and have started grading in several places. The field parties have set nearly all the grade stakes.

DIVISION OF ROAD ECONOMICS
J. E. Pennybacker, Chief.

Projects:

Statistical Investigations

The bulletin for the Middle Atlantic States was the first one to go to the printer from the series on road mileage, revenues, and expenditures. The bulletin for the Southern States will be the next, and it is expected to get this bulletin out during the month of June. All information in regard to the New England States is complete with the exception of a few town statistics for Vermont.

Lectures and Road Models

The set of road models which were on display at Charleston, South Carolina, were returned to the Office about May 11.

M. O. Eldridge exhibited a set of models and delivered a lecture at the Michigan State Good Roads Association, Battle Creek, May 10-12.

J. D. Fauntleroy delivered a series of illustrated lectures in the vicinity of Chester and Newell, West Virginia, between May 1 and 4. These lectures were in connection with a bond election campaign.

J. J. Tobin installed a set of road models at the Today and Tomorrow Civic Exposition, Philadelphia, Pa., which runs from May 15 to June 10. Mr. Tobin also went to Newark, N. J., to install a set of models for display during the Newark Industrial Exposition, which opened on May 13 and is to continue until June 3.

Mr. Pennybacker left May 24 for New York and Trenton, New Jersey, to confer with State Highway Department and prison officials in regard to convict labor for road construction. Mr. Pennybacker will return the first of the week.

Economic Post Road Studies

W. E. Rosengarten, during the month of May, made final studies of the post roads in Boone and Story Counties, Iowa, and Muskingum and Licking Counties, Ohio.

Convict Labor Bulletin

The manuscript of the convict labor bulletin is in the hands of the printer and it is expected that it will be ready for distribution July 1.

Experimental Convict Camp

The cost of food during the month of April was 16.7 cents per convict per calendar day, the lowest cost reported to date.

An approximation of the cost of operating the camp from January 10 to April 30, inclusive, indicates 43 cents per man per calendar day, or approximately 60 cents per road-working convict per working day.

The approximate costs of the various kinds of work during the period named were:

Earth excavation.....	15.8 cents per cu. yd.
Rock excavation.....	34.8 " " " "
Clearing and grubbing.....	$41.63 per acre
Cement concrete.....	3.95 per cubic yard

DIVISION OF ROAD MATERIAL TESTS AND RESEARCH
Prevost Hubbard, Chief.

Projects:

Routine Tests and Analyses

During May, 40 samples were examined in the Chemical Laboratory, of which 24 were bituminous materials, 11 galvanized metal, and 5 miscellaneous. 104 samples of rock, sand, gravel, etc., were received in the Physical Laboratory and 84 samples were examined. 89 samples were examined and classified in the Microscopic Laboratory.

Beginning as shortly after June 1 as practicable, all reports of routine rock tests will be transmitted to the senders without remarks except in special cases. A table showing the limiting values in general use for rock used in various types of road construction has been prepared and will appear upon the back of each report, thus enabling the sender to interpret the results of tests on the particular sample which he submits.

Research Upon the Properties of Dust Preventives and Road Binders

The investigations described in the April Field Letter are being continued but no conclusive results upon any of these investigations are as yet ready to be reported. The laboratory force has been so constantly engaged upon routine work and upon other projects that no new researches have been instituted. Shipments of apparatus for installation in the experimental refining plant at Arlington Farm are being received, and the contractors state that the complete installation will be in place at an early date.

Nonbituminous Road Material Investigations

Work has been resumed on laboratory investigations of typically good and typically poor top soils. This project, which was outlined in a previous Field Letter, was temporarily discontinued sometime ago in order to rapidly complete work on the specific gravity determination. Some interesting relations between the laboratory tests and service results of top soils have been developed. The work so far done indicates that the proportion of coarse sand, as separated by a certain screen, to fine sand and clay, together with the cementing value of the top soil, will give an indication of its value for use as a road material. While the laboratory is not yet ready to state definitely that the methods used will absolutely differentiate between a good and a poor top soil, it is interesting to note that out of a total of some 35 samples from Virginia and North Carolina which have been examined, only 2 exceptions have been noted in connection with the method of differentiation.

Work on the effect of impact on sections of pavement constructed with paving brick and different types of cushions and fillers has been delayed pending the arrival of brick, which has been ordered. The apparatus for making the test has been completed.

An article upon the mineral composition and properties of rock for road making has been published by request in the May number of The American City "Town and County Edition." This article, which is a summary of Bulletin 348, was prepared by Dr. Lord, and contains 13 figures representing photographs of thin sections of rock and various types of rock screenings used in road making.

It is expected that Bulletin No. 370, by Mr. Hubbard and Mr. Jackson, upon the results of physical tests of road building rock, will be issued within a week or ten days. This bulletin will contain the results of all rock tests made by the Office to January 1, 1916.

Standardization of Methods of Testing

B. A. Anderton has returned from a three months' furlough and resumed the investigation of the fixed carbon test. He is at present studying the effect of varying gas pressure upon the results obtained.

The float test is being studied to determine the effect of variables, in much the same manner as the penetration test was dealt with. The results so far obtained indicate that slight differences in the weight and thickness of the collar do not materially affect results, but that the initial temperature of the saucer may have a considerable bearing on the variations in results obtained.

Experiments are under way with a view to developing a consistency test of bituminous materials for both laboratory and field use that will cover a wider range of fluid materials than tests at present in use.

Additional work on the specific gravity determination is being continued with a view to supplementing data embodied in a paper recently prepared for presentation at the Annual Meeting of the American Society for Testing Materials, by Mr. Hubbard and Mr. Jackson.

Mr. Goldbeck and Mr. Smith have prepared a paper on a new apparatus for determining soil pressures, which they have recently perfected. This paper will be presented at the coming meeting of the American Society for Testing Materials.

Experimental Bituminous Road Construction and Maintenance

The preliminary plant experiments with a wet mixture of soil and asphalt cement proved sufficiently encouraging to warrant the construction on May 9 of a 50-foot experimental section of road on the Arlington Farm. This road is 9 feet in width and is composed of a very fine soil containing considerable clay. The old road was excavated to a depth of 2 ~~feet~~ inches and the subgrade prepared by shaping and rolling. The excavated material was taken to the contractor's paving plant and mechanically mixed with the proper amount of water and hot oil asphalt of approximately 100 penetration. The mixture thus prepared was spread over the subgrade and shaped as well as possible with rakes. When partially dried out it was lightly rolled with a 3-ton tandem roller. Numerous contraction cracks, due to the evaporation of water, developed as the pavement dried out, and these were filled with a thin grout of bituminous soil mixture. The pavement has given favorable results under light horse-drawn traffic for a period of two weeks while the adjacent soil road has been badly cut up in wet weather. It is hoped that the results obtained from this experiment will lead to future work on a larger scale.

Messrs. Hubbard and Reeve have cooperated with the Division of Construction in laying certain of the bituminous-gravel experiments on the Russell Road, now known as the Page Road. Both the Chemical and Physical Laboratories have taken part in the selection and inspection of materials for use in the Virginia Post Road between Alexandria and Gum Spring.

On May 10, Mr. Hubbard inspected the Maine Post Road and submitted a report relative to its maintenance by surface treatment this summer. On May 11 he inspected the Rockland-Rockport Road and also the experimental sections of bituminous concrete constructed at Newton, Massachusetts, in 1909.

Concrete Investigations

During the past month a reinforced-concrete slab, of 16 feet span length, 32 feet in width, and 16 inches in effective depth, was poured, and will be tested during the coming month. This slab is the heaviest slab that has been prepared thus far. Arrangements have been made to split off sections from the ends of the slab as the test progresses, in order to determine the influence of the width of the slab on its effective width.

There has been tested a smaller slab of 6 feet span length, 12 feet in width, and 5 inches in effective depth. The ends of this slab were broken off by means of plugs and feathers during the various stages of the test.

The forms are now ready for the new soil-pressure building at Arlington, and concrete will probably be poured during the present week. A contract has been let for the erection of a galvanized-iron covering over the soil-pressure building.

The investigation of the flow of concrete is being continued.

DIVISION OF RURAL ENGINEERING
E. B. McCormick, Chief.

Projects:

Domestic Water Supply and Sewage Disposal

Plans for development of a spring and for pumping the water with a hydraulic ram to an underground reservoir have been transmitted.

The model sewage disposal plant at Bethesda, Md., has been put in operation and the grounds graded. A similar plant is approaching completion upon a farm near Leonardtown.

Illustrations for Year Book article, "Sewage Disposal on the Farm," are well advanced.

Farm Structures

The farmstead model, after some slight rearrangement, is nearing completion; the buildings are completed; there remain the making and placing of trees, shrubbery, etc.

Working drawings for two barn plans are practically completed, one being a general barn suited to conditions prevailing in the North Atlantic States; the other, a horse barn of general application.

Work on two farmhouse designs has been interrupted by work for other bureaus - however, one of the designs is practically completed and will be ready for distribution within the month.

Working drawings for a combined machine and wagon shed and shop are being traced.

Sketches are being made for two cottages to be erected at Iberia Experiment Station, Iberia, Louisiana.

Drawings for equipment for a Meat Inspection Laboratory at St. Louis, Mo., have been completed for the Bureau of Animal Industry.

Field Experiments

Final tests on the Texas Post Road were completed May 9, and the wagon shipped to Aiken, S. C. Elmer Johnson, A.M.E., is running the final tests on this project; A. M. Daniels, A.M.E., reported at Washington upon completion of the Texas tests.

Data is being worked up for a preliminary report on the Texas project.

Thresher Explosions

Experiments conducted on the Arlington Farm have proved the device designed to extinguish fires from dust explosions in threshing machines to be thoroughly efficient. An early issue of the Weekly News Letter will contain an article on the experiments made in this connection.

DIVISION OF ACCOUNTS
W. C. Wyatt, in charge.

The Comptroller of the Treasury has issued the following decision dated May 9, 1916. It will be seen by this decision that he questions the propriety of charging a per diem where the traveler leaves his official headquarters at 7 P.M. It has been noticed from accounts in this Office that quite a number have been in the habit of claiming a per diem for breakfast when leaving the official headquarters at 8 A.M. and for supper when leaving at 7 P.M. or afterward, and in future in order to comply strictly with the Comptroller's decision, claims for per diem should not be presented where the traveler leaves his headquarters as late as 8 A.M. or 7 P.M.

The decision is as follows:

TREASURY DEPARTMENT
WASHINGTON

May 9, 1916.

John G. Saunders, Esq.,
United States Marshal,
Richmond, Virginia.

Sir:

I have your letter of the 5th instant, as follows:

"I respectfully request your decision as to whether the payment by me from the appropriation 'Salaries, Fees and Expenses of Marshals, U. S. Courts', of the item of marshal's expense incurred in traveling on official business,

as stated below, and similar items in future, is authorized.

'April 30, 1916; Supper on boat..... 75¢'

"This boat is scheduled to leave Richmond, Va., for Norfolk, Virginia, at seven P.M. daily. My supper hour at my residence is never before seven P.M. My residence is so far from the wharf from which the boat leaves that it is necessary that I leave my home not later than six P.M. in order to reach the boat before it leaves. This boat is used by me frequently in going to Norfolk, Virginia, on official business, and as I always have my supper on the boat I will thank you for your decision as to whether items of expense such as stated above are properly chargeable and payable in my expense account."

"A United States Marshal is entitled to necessary expenses of lodging and subsistence, not exceeding $4 per day, when necessarily absent from his official residence on official business. (Sec. 12, Act of May 28, 1896; 29 Stat., 183.) Assuming that the meal in question is taken after the boat leaves Richmond, the sole question for determination is whether or not this expense is a necessary expense of the official trip.

"Where a person who travels on Official business finds it impracticable to take a meal at his official residence before commencing a trip, the expense of taking it en route is a necessary and legitimate expense of the trip; but such person should not put the Government to unnecessary expense for a meal which might have been taken before the trip commenced.

"The hour of seven P. M. seems to afford time in which to take the evening meal before commencing the trip. The reason given for not doing so is personal or domestic, and not official. The resulting expense therefore is not a necessary official expense and you are accordingly not authorized to pay it.

Respectfully,

(Signed) C. M. Foree,

Acting Comptroller."

All field men having in their possession transportation requests payable from the appropriation for the fiscal year 1916 should forward to this Office promptly at the close of the present fiscal year June 30, 1916, all unused books of transportation requests in order that they may not be issued for transportation after the close of the fiscal year.

At the close of the present fiscal year the employees having mileage or scrip books in their possession which have been paid for by the Department, should submit a statement showing the last number in each book in order that the records of transportation purchased from funds of the Office may be checked up. If you have any mileage or scrip books on hand on which the time limit has been reached, they should be forwarded to this Office for a refund, if any, for cancellation.

DIVISION OF IRRIGATION INVESTIGATIONS
Samuel Fortier, Chief.

Projects;

Administration

Dr. Fortier spent the first three weeks of May in the field inspecting the work being done in Colorado, Wyoming, Utah, and Idaho, and conferring with the fieldmen in those states. At Denver he arranged for additional experiments in determining losses of water from reservoirs and canals by evaporation, to be carried on at the Denver field laboratory by Mr. Sleight, A.I.E. At Cheyenne, Wyoming, it was decided, after conference with the Governor, to discontinue the cooperative work in Wyoming. Mr. Kingdon, I.E., and Mr. Gordon, I.F., will spend the present summer closing up the investigations begun under the cooperative agreement and in preparing a report. At Twin Falls Dr. Fortier conferred with Mr. Sloan, D.E., who is completing his report on the Twin Falls drainage investigations and with M. R. Lewis A.I.E., who has succeeded Mr. Beck at the Twin Falls Experimental Farm. At Logan, Utah, he conferred with Mr. Winsor, I.E., regarding the cooperative work in Utah, and with Mr. Hart, S.D.E., on drainage of irrigated land in the Rocky Mountain States. Dr. Fortier also conferred with Mr. Diesem, I.E., regarding the work on the Great Plains and inspected the work being done under the direction of Mr. Cone, I.E., at Fort Collins and in the Cache la Poudre Valley, Colorado. He returned to the Washington Office May 19.

Utilization of Water

C. E. Tait, I.E., has been making a preliminary examination and report on the spreading of storm waters in the Coachella Valley, California, in order to replenish the under-ground supply of water for irrigation in that valley.

Mr. Veihmeyer, A.I.E., is just completing the duty of water studies which he has been carrying on for several years in the Imperial Valley, California, and when the report of this work has been completed he will be assigned to other work.

R. D. Robertson, I.E., finished preliminary arrangements in the rice fields of Sacramento Valley, California, for investigations of the duty of water for rice in cooperation with the California State Water Commission, and for the rest of the season the field work will be carried on by Charles L. Kaupke and Hugh S. Patton, cooperative agents. The use of water is being measured on about 17 farms widely scattered over the valley.

On May 17 R. D. Robertson, I.E., and H. K. Fox (temporary assistant carried on the University of California funds) left for the southern end of San Joaquin Valley to begin the study of irrigation of deciduous orchards, this constituting the main new project being handled out of the Berkeley office this season. Messrs. Robertson and Fox will spend most of the irrigation season of 1916 in reconnaissance investigations of present practice, working north through San Joaquin and Sacramento valleys, and south through Napa, Sonoma, Santa Clara, Pajaro, and Salinas valleys into southern California. This reconnaissance investigation is needed as a basis for outlining the more detailed studies to follow.

On May 22 S. H. Beckett, I.E., began the collection of data in the field dealing with the preparation of land for alfalfa irrigation in California, going first to the southern end of the State, after which he will work through San Joaquin

valley. The data will be used in conjunction with data already gathered in Sacramention valley during the past three seasons for the preparation of a special report by Mr. Beckett and R. D. Robertson, I.E. While in the field during the present season Mr. Beckett will collaborate with Milo B. Williams, I.E., in the collection of data regarding pumping for irrigation in California, who will at the same time also work on his main project dealing with sewage irrigation.

With the assistance of Wells A. Hutchins, A.I.E., S. H. Beckett has completed a report on field experiments at Davis during the past 6 years which will be submitted to the Washington Office and to the University of California for publication.

Appliances and Equipment

E. J. Hoff, Mechanician at the Berkeley office, has suggested the following instructions to field men in the Irrigation Division, relative to the shipment of instruments:

In packing instruments for shipment it is a good plan to fasten all loose parts by means of strings to standards or base and to wrap in paper such pieces as weights, keys, etc., before fastening. This is to prevent damage to the instruments by collisions of the various parts and if a few loosely crumpled papers are placed between the instrument parts before the covers are attached, all precautions for safe transportation are taken. It is suggested a number of instruments should never be packed in one large packing box unless the greatest care is taken about the detail packing, because large boxes are less gently handled than small parcels. As an economic, safe, and convenient method of shipping water registers, current meters, and the like, advantage should be taken of the franked mailing tags for 20-pound parcel-post packages. When the instrument proper is packed as mentioned above, the cover fastened to its base by means of a rope or wire (if possible with a loop for easy carrying), a franked tag with address and a red "fragile" tag (obtainable at postoffices) attached, the instrument will reach its destination in best condition. Postoffice clerks will handle parcels of this description carefully, particularly when they can see what they have to take care of and when conveniences are provided for easy handling.

Flow of Water

F. C. Scobey, I.E., and Paul A. Ewing, A.I.E., left Washington May 29 to continue the experiments on flow of water in concrete pipes begun by Mr. Scobey last year. They will first visit Southern Canada, and later cover the Pacific states.

Customs, Regulations, and Laws.

C. E. Tait, I.E., expects to complete, before the end of the fiscal year, the report on mutual water companies of southern California, on which he has been working for several years.

F. G. Harden, I.E., is beginning a study of public control of irrigation in the United States, with a view to determining the advantages of the various forms of control exercised by all governmental agencies. He expects to complete the office study of the Southwestern States early in June, and then make a field study of these States. At the same time he will continue his study of cooperative irrigation enterprises and prepare to complete his report on that subject during the coming winter.

DIVISION OF DRAINAGE INVESTIGATIONS
S. H. McCrory, Chief.

Projects:

Administration

On May 4-5 S. H. McCrory and J. V. Phillips attended the annual meeting of the Georgia State Drainage Association which was held at Monroe. Mr. McCrory delivered an address on "What the Department of Agriculture Is Doing to Encourage the Reclamation of Our Wet Lands." Mr. Phillips spoke on drainage in the Piedmont sections of Georgia. The attendance at the convention was about 300.

On May 21, Mr. McCrory left the Office on a trip through the middle west, going first to Onawa, Iowa, where he has conferred with Messrs. Ramser and Guy A. Hart concerning the run-off investigations on which they are now engaged. While at Onawa he will also confer with the representatives of the Towl Engineering Company of Onawa concerning the plans of the Monona-Harrison Drainage District. It is understood that this Company has been appointed engineer of the district. Before returning to the Office Mr. McCrory expects to call on W. N. Hall and O. G. Baxter. He also intends to confer with the officials of the Panther Creek Drainage District concerning the construction of ditches across the rights-of-way of the Louisiana and Nashville Railroad and the Illinois Central Railroad. On this trip it is quite probable that he will examine a tract of land near Saginaw, Michigan.

Farm Drainage

On May 17, Fred F. Shafer returned to the Office after completing work in Indiana, Kentucky, and West Virginia.

H. M. Lynde advises that a farmer in Brunswick County, N. C., gave him the following cost data concerning some cement tile which he made on his farm with a Farmers' Cement Tile Machine.

16 bags of cement	$10.00
Freight on cement	2.00
Hauling cement 12 miles, 1 day	2.50
Hauling 4 loads sand 3 miles, 1 day	2.50
Labor, 1 man, 5 days	5.00
	$22.00

Mortar consisted of 1 part cement, 2 parts fine sand, 3 parts coarse sand. Product was 1,000 feet of 4-inch tile. It was not stated whether the above figures included the cost of curing, nor was the curing method described.

A manuscript on Farm Drainage in Virginia, by D. L. Yarnell, has been submitted to the Commissioner of Agriculture and Immigration for publication as a bulletin of that Department.

Reports Transmitted:

D-5B Animal Husbandry Farm, (costs) Beltsville, Md., by D. L. Yarnell.
D-5B Dairy Farm, (costs) Beltsville, Md., by D. L. Yarnell.
D-6 Farm Drainage in Virginia, by D. L. Yarnell.
D-8X Shawondassee Farm, Belhaven, N. C., by F. R. Baker.
D-8X Gaither's Farm, Hertford, N. C., by H. M. Lynde.

D-9 Ashley Hall Plantation, S. C., by F. G. Eason.
D-10 Evans Tract, Washington Co., Ga., by Q. C. Ayres.
D-61 Burkhart Farm, McCracken Co., Ky., (ground water) by Fred F. Shafer.
D-61 Mt. Airy Farm, Va., (ground water) by D. L. Yarnell.

Reports Received:

D-5 Holland Farm, Northampton Co., Va., (cost and construction) by J. R. Haswell.
D-43 Farm Drainage in Humid Sections of California, by W. W. Weir.

Overflowed Lands

J. V. Phillips, in cooperation with officials of the Georgia Geological Survey, has completed a reconnaissance of the swamp and overflowed areas of Georgia. Before returning to the Washington Office he will make several preliminary examinations and give assistance to farmers.

F. G. Eason and S. W. Frescoln commenced a survey of lands along Eighteen Mile Creek in Anderson and Pickens Counties, S. C.

During the month O. G. Baxter made examinations in Oklahoma and Missouri.

Reports Transmitted:

D-9 Bamberg Drainage District No. 1, Bamberg Co., S. C. by F. G. Eason.
D-10 Shoal Creek Drainage District, Walton County, Ga., by J. V. Phillips.
D-23 Stranger Creek Drainage District, Leavenworth County, Kansas, by O. G. Baxter.
D-27 Big Black River Drainage District No. 1, Mississippi, by Lewis A. Jones.

Reports Received:

D-29 Farelley Lake Levee District, Jefferson County, Arkansas, by O. G. Baxter.
D-31 Clear Boggy Creek Drainage District, Coal Co., Okla., by O. G. Baxter.

Swamp Lands

Reports Transmitted:

D-9 W. Buckfield Lodge, S. C., by F. G. Eason.

Reports Received:

D-8X Big and Little Alligator Swamps, Brunswick Co., N. C., by H. M. Lynde.

Tidal Marsh

Reports Transmitted:

D-4 St. Georges Marsh Company Lands, Newcastle, Delaware, by J. R. Haswell.

Irrigated Lands

Reports Transmitted:

D-35A Bihr Ranch, Wyo., by D. E. Heizer.
D-35A Ilg Ranch, Worland, Wyo., by D. E. Heizer.
D-35A Worsterburg Ranch, Worland, Wyo., by D. E. Heizer.
D-37A San Juan Indian School, Shiprocl, N. M., by D. G. Miller and Guy A. Hart.
D-39A Criddle Farm, Clearfield, Utah, by W. N. Hall and Guy A. Hart.
D-39A Hooper Drainage District, Utah, by W. N. Hall.
D-39A Plain City Drainage District, by W. N. Hall.
D-43B Kearney Vineyard, (ground water) by W. W. Weir.

Report Received:

D-36 Drainage of Shale Lands, by D. G. Miller and L. T. Jessup.
D-36 Wiley Drainage District, Prowers County, Colo., by L. T. Jessup.

Construction, Operation and Maintenance of Drainage Improvements

During the entire month C. W. Okey and Dan S. Helmick were engaged in testing the efficiency of drainage pumping plants in Illinois, Iowa, and Missouri. These tests will be completed the early part of June.